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form, of finding out how he can form those habits, and then standing by him until the habits are formed and the new life fairly on its way. It is not enough for us that we shall be protected from the contagion of smallpox, that we shall not be inoculated with the plague, that we shall not have our water supply contaminated with the typhoid bacillus. It is not enough even that the tissues of our bodies shall be highly resistant to various diseases. There is the great positive constructive side which relates to life's habits that needs attention, and without such attention the individual is helpless in securing for himself that high degree of efficiency which every skilled engineer demands from a good piece of machinery.

This phase of medical practise is gradually coming to be recognized by the laity and is being met by the profession. It is obvious that equipment for such practise involves, as does every other medical specialty, the classic studies of the regular medical curriculum. This specialty also, like every other specialty, demands its own kind of aptitude, as well as that specialization in study and experience which belongs to a specialty. It consists essentially in bringing medical science to bear upon the whole life of the patient, so that it may be raised and kept on the highest attainable level of efficiency and wholesomeness.

III. CONCLUSION

This is not the place to discuss other great problems that are incident to the life of the city or to that of the individual. I have tried merely to show that community life is of necessity increasing; that the conditions that are deleterious to health can be and are being met; that the prospect is already clearly in view that urban conditions will be more favorable

to human life than rural conditions; that the desire of our kind to live in close relations can be gratified with a gain, instead of a loss of human life and vitality.

It is not enough that medical science shall be increasingly successful in combating and curing disease by means of drugs, surgery, suggestion and hygienic measures. It is not enough that the great sources of disease shall be eliminated by providing freedom from contagion and infection through uncontaminated water, pure food, fresh air. It is not enough that by means of these or other measures we shall be rendered immune to any or even all diseases. It is not enough that we look forward with firm confidence to the control of tuberculosis, and even pneumonia, cancer and arteriosclerosis.

The science of medicine needs and is developing groups of specialists who are raising the efficiency of individuals by discovering the precise ways in which those individuals, with their particular constitutions, may best live in their particular environment. There are also developing other groups that are solving the problems of how human kind shall live in the new and glorious era that we are so fast entering, the era of living together, the era of the city.

LUTHER HALSEY GULICK

THE RESEARCH LABORATORY OF PHYSICAL CHEMISTRY OF THE MASSACHUSETTS INSTITUTE OF TECHNOLOGY

DURING the past year thirteen men, including four candidates for the Ph.D. degree, have been working in this laboratory upon researches in theoretical and physical chemistry.

One of the main lines of work is the continuation of the research upon the properties of salt solutions in relation to the Ionic Theory, which, with the view of developing that theory, has been carried on for a number of years under the direction of Professor A.

A. Noyes. The special subjects at present under investigation are: (1) the transference numbers of tri-ionic salts by Dr. K. G. Falk, with the purpose of determining whether intermediate ions, such as KSO_4^- or PbNO_3^+ , exist in considerable quantity; (2) the electrical conductivity of mixtures of salts, by Mr. A. C. Melcher, Dr. W. C. Bray and Mr. F. L. Hunt, with the purpose of establishing the general law governing the ionization of salts; and (3) the solubility of salts in the presence of other salts, by Dr. W. D. Harkins, with the purpose of determining empirically the form of the law of solubility effect which must be substituted for the inexact mass-action form of that law. This line of research has again been aided on the financial side by a grant of \$3,000 made to Professor A. A. Noyes by the Carnegie Institution of Washington.

Another of the main lines of research in the laboratory, which is being carried out by graduate students under the direction of Professor G. N. Lewis, is the experimental determination and computation of a system of values for the free energy of chemical substances analogous to the system of values for the total energy previously developed by thermochemical investigators. The problem is one of fundamental importance to the science of chemistry, since from the free-energy data for the substances the equilibrium of the chemical reactions in which they are involved can be computed. The special reactions now being studied in this direction are: (1) that between sulphur and water, producing sulphur dioxide and hydrogen sulphide, by Mr. Merle Randall; (2) that between nitric oxide, nitric acid and water, producing nitrous acids, by Mr. Arthur Edgar; and (3) that between chlorine gas and chlorine-ion in aqueous solution, which is being studied by electromotive force measurements by Mr. F. F. Rupert.

Dr. W. C. Bray has continued the studies of the equilibrium of some chemical reactions begun a few years ago in this laboratory by Mr. G. M. J. Mackay; namely of those between solid cuprous iodide, iodide and cupric

iodide in solution, between potassium iodide and polyiodide in solution and between iodine and water.

During the past year articles describing theoretical studies upon the newly developed principle of relativity have been published by Professor G. N. Lewis and by Mr. R. C. Tolman; and an article upon the quantitative application of the theory of indicators to volumetric analysis has been prepared by Professor A. A. Noyes. An experimental study of indicators from this standpoint has been undertaken by Professor M. S. Sherrill.

SCIENTIFIC NOTES AND NEWS

PROFESSOR GEORGE DAVIDSON, of the University of California, eminent for his contributions to astronomy, geography, navigation and geodesy, celebrated, on May 9, his eighty-fifth birthday.

COMMANDER ROBERT E. PEARY lectured before the Imperial Geographical Society of Vienna, on May 18, and was presented with the gold medal of the society.

PROFESSOR WALTER NERNST, professor of physical chemistry at Berlin, has been elected an honorary member of the Manchester Literary and Philosophical Society.

It is stated in *Nature* that the council of the Institution of Civil Engineers has made the following awards for papers during the session 1909-10: a Telford gold medal to Mr. C. M. Jacobs (New York); a Watt gold medal to Mr. J. D. Watson (Birmingham); a George Stephenson gold medal to Mr. D. A. Matheson (Glasgow); Telford premiums to Messrs. F. C. Buscarlet (Sunderland), A. Hunter (Glasgow), I. C. Barling (Tyne-mouth), J. Dalziel and J. Sayers (Derby), and J. Shaw (Birkenhead), and the Manby premium to the late Mr. C. W. Hodson (London).

ONE of the Carnegie research scholarships of the Iron and Steel Institute, London, has been awarded to Professor Paul Gorenz, of the Royal Technical College, of Aix-la-Chapelle, for a study of the properties of cold-hardened iron and steel.